



# Dementia Alzheimer's Assistive Design

Raising Independence & Strengthening the Bond between People  
Living with Dementia & Their Carers

# AUTHENTICITY STATEMENT

This is to certify that to the best of my knowledge; the content of this report is my own work. This report has not been submitted for any subject or for other purposes. I certify that the intellectual content of this report is the product of my own work and that all the assistance received in preparing this report and sources have been acknowledged.

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# ABSTRACT

This research report will delve into the mentality and ethics of people living with Dementia Alzheimer's and the connection they have with their partners and carers. This will be explored within the context of the public area, and what can be done to educate and share awareness of the disability. A literature review will be conducted to educate and gain knowledge on what has already been done, the psychological aspects, and already existing studies on the daily life on a Dementia patient. In addition to this, online surveys, interviews, and observations will be conducted to gauge at expert opinions and knowledge in this area. Doing so will provide further context and design opportunities, that can be drawn upon to iterate with Industrial Design expertise for further development into a product that will intervene the system of the Dementia Alzheimer space.

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# 1 |

# INTRO

The population of people living with Dementia, more particularly, Alzheimer's, is steadily increasing and does not seem to be slowing down anytime soon. Disability/ aged care homes are now increasing in size due to this, stretching the nurses and carers thin. What this leads to, is shorter attendance to different patients in the care homes, which results in less interaction and time-away for those people living with the disease. Along with the home scene, where these patients are being cared by a partner and goes out with a support worker every now and then. All-together, the actions and reactions from these carers influence the person living with Dementia both in positive and negative ways. This research report investigates and attempts to solve the negative aspects of living with Dementia, the minimal independence and a heavily reliance on carers in the middle to later stages of Dementia.

The aim of this research report is to explore the difficulties and limitations of living with Dementia Alzheimer's, outline what is involved for both the patient and carer and understand how these can be minimised and hopefully solved with the Dementia patient's willingness, and the carer's trust. This report's area of interest will be looking at the independency of people living with Dementia. This aspect is generally regarded to be quite important to their mental health and wellbeing. However, it can be difficult to enact on this. Especially since safety and guidance is more important than ever when looking after these patients. Forgetting, wondering and confusion are the main factors in limiting their ability to be out in public alone. This results in most people living with Dementia, being kept inside most of the time

for the remainder of their lives, which enables the disease to worsen quickly.

The desktop research looks closely into Sweden's treatment of their Dementia population, as it is commonly ranked as the highest in Dementia care, within Europe. General rules, background info, ethics, and colour coding were conducted afterwards. The primary research conducted of Qualitative and Quantitative research, which features an online survey, and in-person interviews and observations. Visuals, themes, and sub-themes also accompany this data. The desktop and primary research conducted throughout the development of this report followed a structure, which allowed for well-represented visuals, conceivable concepts, and a wealth of knowledge behind the topic. Below is a project structure that briefly summarises this process.

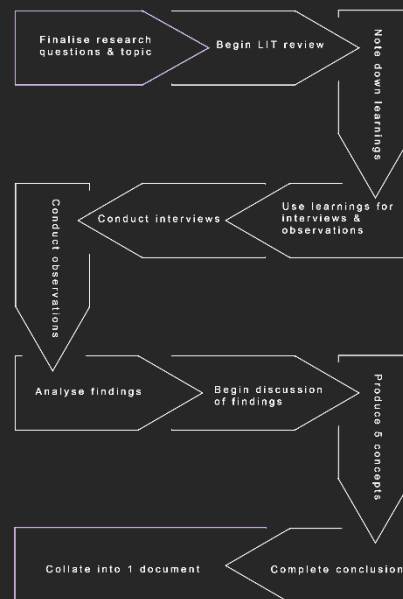


Figure 1: Project Development

With the structure and plan in place, the literature review of academic and other relevant sources can be conducted. The context of the design and research is

Dementia Alzheimer people living and continue moving to be as independent as possible.

# 2 | LITERATURE REVIEW

A literature review was conducted on this topic area to obtain a better understanding of people living with Dementia. To understand what level Australia was at, in terms of caring for people with Dementia, the first topic to research into was how Sweden compares. This was to give me some comparisons between my research and product research further on.

Being happy and independent as possible, and everyday activities in a Dementia-friendly environment is often said to be the best living conditions for people living with Dementia. With “familiar environments, routines and a home environment which assists in knowing where they are and where to go.” (Better Health, n.d.). This is often relayed in Sweden as from “24<sup>th</sup> May 2018, the Swedish Government launched a strategy to improve Dementia care.” (Alzheimer Europe, n.d.). This plan has yielded incredibly results, with specific homes being exclusively developed for people with Dementia. Providing relatives with training programs, and “short-term accommodation for those Dementia patients. Which alleviates burden and stress temporarily for those relatives.” (Jelic, n.d.). ‘SVEDEM’, (The Swedish Dementia Registry) is the “national quality registry on Dementia, which launched in May 2007, and brought to life by the Swedish Association of Local Authorities and Regions and the Swedish Brain Power Network.” (Jelic, n.d.). With a large majority (90%) of memory clinics in Sweden being part of ‘SVEDEM’. The Registry also provided several quality parameters, which “improved time referral, and initiation of workup to diagnosis, half of newly diagnosed patients living alone, no gender

differences, and various patient diagnosis and Dementia workups.” (Jelic, n.d.).

Along the research of Sweden’s Dementia care treatment, an affordable homes project was found. This project’s purpose was to create homes and living spaces that were better designed for those living with Dementia and assist them in living independently for as long as possible. “‘Silviabo’ are designed group apartments, which provide easier living and caregiving for those with Dementia,” (Bushak, 2019) and allowing their partners to live with them. These group homes solved the inevitable for those diagnosed patients that will eventually require either 24/7 care at home, or to be transported to a nursing home. The specially designed homes bring forth Dementia friendly features:

- “Wide, even outdoor walkways
- Large navigational signs
- Timed power sockets, extra grip handles, and extra counter space next to fridges
- Alarm buttons, strong lighting, and anti-slip floors in the bathrooms
- Outdoor clubhouse and greenhouse for socialising between patients
- Roomy elevators with larger, and more pronounced buttons
- Wide entrances, automated doors, extra lighting in common areas, and wind and rain shelters outside each apartment” (Bushak, 2019).

In addition to these, there is easy access to day-cares. Where burnout and stress for the partners living there can be relieved and they can take a breather. This also allows the Dementia patients to continue living independently for as long as possible, and further improve their quality of life. However, when living alone, all Dementia patients are at risk of personal injuries. This is where carers and care guidelines come into the equation.



Avoiding direct focus on the disease, is often suggested by care guidelines. Instead for the carers to put more of an emphasis on the patient's hobbies and lifestyle. As the person living with Dementia are constantly reminded of the disease's limitations every day. A common primary objective of carers is to try to keep Dementia patients "home for as long as possible. Providing them with further support, outside activities and travelling." (Jelic, n.d.). Carers and partners need to be aware of handling situations with the person with Dementia appropriately. This could be "not telling them they are wrong at something, not arguing, not asking if they remember something, and avoiding reminding them and bringing up their dead loved ones and upsetting topics." (Marley, 2013).

Understanding the physical attributes and limitations of Dementia patients are quite integral to any sort of disability research. Daily routines that are planned, are "more ideal as disease worsens, with further enjoyment when joining others in various activities. When both are structured and pleasant, their mood improves and reduces any sort of agitation." (Alzheimer's Association, n.d.). *BMC Geriatrics* identified that through their studies of physical limitations, different types of Dementia do perform differently, and not often considered, with differences of "cardiovascular, cognitive, and well-being." (Bowes, 2013). When balanced correctly, physical activity can yield potential benefits. Those being "cognition, mood, behaviour, physical condition, and social benefits" (Bowes, 2013) for those participating. Within this article, various physical exercise attributes were notified during different stages of Dementia. In the early stages, "cardiovascular fitness, and aquatic exercise yielded reduced brain atrophy and overall functioning improvements respectively" (Bowes, 2013). During the late stages, "speech and recognition, and socials and interaction were all increased, along with hand grip and muscle strength exercise increased muscle strength"

(Bowes, 2013). In the moderate to severe stages, "chair-based exercises were tested, which immediately improved anxiety and depression. Along with walking programs, which saw improvements in communication, compared to being only a conservation program." (Bowes, 2013).

Colours play a substantial role in Dementia Alzheimer patients in recognising various objects and interactions. The *Colour Choice Preference in Cognitively Impaired Patients* article found that patients often chose "forms corresponding to auxiliary colours. These being violet, brown, black, and grey, on the 'Luscher Colour Test'. The personality characteristics that are connected to these colours are: sensitiveness, relaxation, coercion, and numbness." (Stanzani, 2019). Another article (*Analysis of the Use of Colour for Early Detection of Dementia*) looking into colour, found there was a "preference to using yellow to red colours in paintings during the early stages, and darker colours in the later stages. With a common difficulty with differentiating between blue to green." (Ostermann, 2022). This difficulty of differentiating blue to green is further validated by the *Aging and dementia-friendly design theory* article, where red and yellow is easier for them. "Stronger contrasting colours are needed for these strong and bright colours to be noticed." (M. Weiner, 2021). The *Ageing and dementia-friendly design theory* article describes that "icons should be familiar to Alzheimer patients, as further in the stages, the disease negatively impacts the understanding of icons and signs." (M. Weiner, 2021).

The *ethical issues in preventing Alzheimer's* article, identified brain cognitive function declines can be prevented through social outings, physical exercise, and keeping the mind generally active through brain fitness and various digital devices. But also "changes to the community and culture through educating groups of people would be beneficial." (J Whitehouse, 2019). The author



of this article suggested safe green houses for families may also be beneficial, which validates the Sweden Dementia-specific housing developments. “Daily life needs, focusing on themselves, maintaining their own well-being, and communicating and interacting with their surroundings” (Holt Clemmensen, 2021) are all needs that should be satisfied for the carer to support their patient to the fullest. Positive experiences with their client, and better-quality relationships lead to caring success. The author of this article, sees Dementia caring as “more burdensome compared to other chronic illnesses.” (Holt Clemmensen, 2021).

Throughout the research phase, a webinar was available from *Dementia Training Australia* labelled, *Designing for Older People*. This discussion brought in architects, interior designers, landscape architects, and health professionals. The initial discussion was on co-design, consultations, and patients getting lost. Getting confused was a major talking point. Due to many residents wondering about and forgetting where they are going, nurses keep an eye on patients using various means of technology, which can be seen as evasive and not allowing the area to feel like home. Various rooms look quite familiar, which lead to the discussion of a ‘way finder’ on the doors. This links to the Swedish home project.

Technology often seems to be a promising solution. However, heavy reliance on technology function, might be difficult for patients. There cannot be many functions, as “older people and carers can face considerable stress with newly introduced technology.” (G Stavropoulos, 2021). With the adaptation of technology by older people, “precision and physical issues, reduced dexterity, trust, and familiarity” (G Stavropoulos, 2021) need to be appropriate for the end user, for the technology piece to be accepted. When achieved correctly, older people adapting technology can reduce burden on their partners and carers, which

further benefits both parties. From this rigorous LIT review, the research can begin.

## RESEARCH

Research was conducted to further the understanding and scope of this Dementia Alzheimer's project. Primarily consisting of online surveys (created with SurveyMonkey and shared through email), interviews, and observations. The survey consisted of ten questions, with mixed qualitative and quantitative question approaches. Whereas the interview and observations are qualitative research with the interview consisting of eleven questions. Overall, completing and fulfilling all the research was accomplished within two weeks.

As mentioned before, the survey consisted of both forms of research data. This was evident in the scale options (very likely – not likely) and short answer questions, which provided a mix of opinions and answers. The questions that were provided to the correspondents consisted of little knowledge of the topic, apart from the last question asking about possible wearables in the Dementia Alzheimer's space. Providing simple questions allowed for a more 'free-flowing' questionnaire that was quick (could be completed in three minutes), basic, and non-stressful, compared to the environment of an interview.

The surveys, interviews and observations will be analysed and summarised with the aid of various visuals. The survey questions and answers were identified as being 'Categorical' and summarised in 'Interval and Ratios'. The interviews and observations that were recorded and transcribed, was analysed using the 'Content and Thematic' analysis approach. Where the text was critiqued, and themes and sub-themes were identified.

The interviews and observations were conducted after the responses from the

survey were received. A large portion of the qualitative data was collected using a 'semi-structured' interview. This allowed for the appropriate data to be collected from the planned questions, but also for the interview's conversations to drift off a little, obtaining a larger scope from their professional perspectives. The questions were more built around parts of the literature review, but still simple and easy to understand and answer. This would result in taking advantage of their expertise in the area of study to obtain valuable information that I may not find elsewhere.

The first interview was conducted with Caitlin, who is a registered clinical research nurse at The Mater memory clinic. She originally started nursing seven years ago, enjoys supporting people, and continuous her efforts into research around Dementia. She assists those with the disease to receive proper support and medication, according to their performance on various tests. The primary test used to assess the improvements/ decline in Dementia patients' performance is named the Addenbrookes Cognitive Examination. This can be found in Appendix 4. The interview process was conducted during a check-up of my dad's Dementia progress, if he required any further medication, and a mental health assessment and discussion with mum. The total interview recorded time was fifteen minutes.

The second interview was recorded with Fred, who is a support worker and supports his clients that he works with, in whichever way they need. Fred has been a support worker for at least five years, and he started the position as he got sick himself. He could not work, lost his job, and could not work for two years due to his illness. After getting better, Fred contemplated what he was going to do, and decided to help people. The interview process was conducted during a day Fred was taking out my dad for a day out for lunch and to visit the beach. The total interview recorded time was seventeen minutes.

Observations were also conducted, although they were not performed at the same degree as the other two research methods. These observations mainly consisted of writing notes down of what was seen, before and after the interviews were completed. The observations of the first expert interview involved tests, the environment of the memory clinic, and the check-ups the partner has to partake in (as these partner mental health check-ups are taken extremely seriously). Observations of the second expert interview consisted of mainly how Fred interacted with his client (my dad), the activities that were planned, and Fred's controlled talking manner.

Once all of this data was collected, it was analysed to make tangible graphs and themes.

# 4|

## ANALYSIS & FINDINGS

### Surveys:

Analysing the data from the surveys, interviews and observations was a crucial step. The survey unfortunately only gathered four participants. However, this spanned multiple disciplines, within the memory clinic and by Fred.

### Qualitative Data

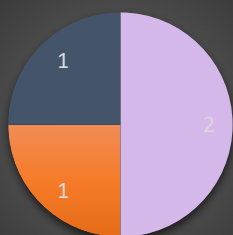


Figure 2: Occupation of Survey Participants

Figure 2 shows the occupations. Two doctors, one nurse and one support worker.



Figure 3: Independence with Dementia

- Having lots of support – 75%
- Activities and interests – 50%

- Routines and reminders – 25%
- A good environment – 25%
- Carer availability – 25%

‘How can someone with Dementia be more independent?’ question answer’s frequency is in Figure 3.

A small text box was provided if the participants had seen any preferences to a particular colour in the middle to severe stages. Where 3/4 participants agreed that there was not, and one responded, “contrast colours work best.”

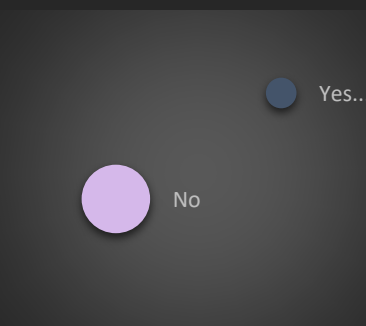


Figure 4: Concepted Dementia Wearables

Figure 4 shows the question of if they have seen any concepted wearables. 3/4 said no, and one responded, “yes, we have seen personal alarm devices, however they only work as long as they are charged up.”

The last qualitative survey question asked if wearables have an important role in the medical, health and aged/ disability care sector? The responses were mixed:

- “Yes”
- “Potentially an area of interest to explore. I don’t have knowledge of this firsthand”
- They could, but it is important to remember that sometimes people are unwell to a point where wearing a device may not be compatible”
- “I haven’t had experience with it”

## Quantitative Data

These questions were highly controlled and provided participants with a set number of answers.

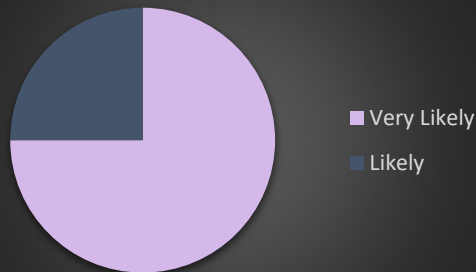


Figure 5: More Content if Independent

Figure 5 was the result to the question of if Dementia patients were more likely to be content when/ if given the opportunity to be more independent.

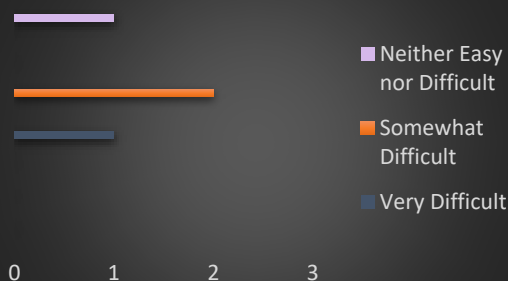
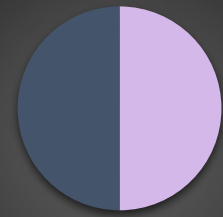


Figure 6: Technology Difficulty

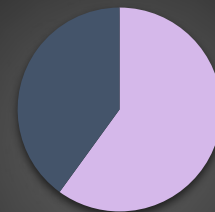
The second graph (Figure 6) asked the question of “how difficult is technology for Dementia Alzheimer patients?”



Very Likely Likely

Figure 7: Likelihood of Patients Getting Lost

Figure 7 was the result of participants responding to, “how prone are Dementia Alzheimer patients to getting lost without a carer in the middle to severe stages?”



Probably Would Probably Would Not

Figure 8: Alarm Device Reliability

Figure 8 asked the participants if a personal alarm device would be effective and trustworthy if it was used by a patient with Dementia Alzheimer's. 3/4 agreed it would, however one said it 'probably would not'.

The remainder and the original results from SurveyMonkey are listed in Appendix 1.

## Interviews:

These are the more noteworthy pieces of the two interviews that were conducted. Parts have been highlighted to signify the themes that were identified. These identified themes are notified after the analysis and findings.

The 15-minute interview with Caitlin from The Mater memory clinic was quite insightful. We brought organisational activities to the forefront at the start of the interview. She agreed that there are people living with the disease that can find this confronting, and often interfere with their mental health.

*“... The key thing is that people need to feel like they’re doing worthwhile and enjoyable things... They may have to give up certain activities for safety and that can really make us lose a lot of happiness and joy in our life.”*

Caitlin could see how frustration would be for partners, but she also believes the person with Dementia can get frustrated at themselves as well.

*“I guess if you must rely on someone to do a lot of things with you or for you, you might get frustrated... To me it’s more the frustration that people get with their own symptoms.”*

Independency was spoken about.

*“... Being as independent as possible is going to make people feel as confident as possible... people with Dementia, in the public sometimes get thought of as they can’t make decisions for themselves anymore”*

Caitlin brought up wearables that are used in the ward.

*“... they might not like the feeling of things on them... Nothing replaces like having a conversation with someone.”*

She suggested if wearables were to be researched into, that using GPS tracking is a fine line. As these patients can get scared, agitated, and upset. Checking in on locations from a distance would be more beneficial, while still giving and keeping the patients’ independence.

The second interview with Fred, equated to 17-minutes. Being a support worker, the responses that Fred provided were valuable

for getting an idea of what it is like looking after someone with Dementia. He said it is necessary for someone to be there for Dementia patients, for safety reasons.

*“... A big thing is getting lost. Once they get lost, they get confused and then things turn really bad once you get to that stage.”*

*“If somebody wants to interfere with that (them make bad decisions) or want to help them, that usually leads to aggression... because they don’t know who they are and they’re trying to help them.”*

Fred agrees that a simple wearable with GPS would be beneficial, along with keeping these people in the community for longer. As he agreed that being in an aged care home can be quite lonely.

*“... All those options (technology) and it might be a bad day and it’ll just make things worse... It’s just another thing to kind of trigger them, so the simpler and easier is definitely much better.”*

Both transcripts in their entirety can be found in Appendix 2.

### Observations:

There unfortunately was not enough variables to observe during my time at the interview sights. In addition to these, observations were also done at home.

Weekly, mum updates a whiteboard for dad to follow and refer to. The date is written in a different colour and in a bolder pen. Days and events are written weekly and underneath the date. This whiteboard can be found in Appendix 3.

When observing The Mater memory clinic, Caitlin shared the details of the Addenbrookes Cognitive Examination, and the process with it. This exam is used to assess the cognitive function of patients, with drawing, writing,

memory and counting tasks. From the exams results, the nurses can then determine if the patient needs further assistance or increased medication. The nurses also talk to their partner about their mental health, which is taken extremely seriously. A scanned version of the Addenbrookes Cognitive Examination can be found in Appendix 4.

The entire daytrip with Fred and his client (my dad) was observed. Mainly how Fred responded and treated his Dementia client. Controlled banter and chatting were quite common throughout. When Fred's client forgot information of what they were doing etc., Fred would remind him without getting frustrated.

The entire day was planned beforehand, which allowed dad to not worry about what was happening.

#### Key Themes, and sub-themes Identified:

Using information and research gathered from the surveys, interviews, and observations, themes and sub-themes could be identified:

- **Safety and Security**
  - GPS tracking
  - Wearables
  - Geo-fencing
  - Reassurance
- **Happiness and Independence**
  - Favourite activities
  - Decision making
  - Freedom
  - Chatting
  - Community
- **Context**
  - Living conditions
  - Lonely
  - Public
  - Safe
  - Carers/ partners
  - Colour preference

- **Frustrations/ Difficulties**
  - Lack of independence
  - Limitations to what they can do
  - Limitations to their favourite things
  - Public assistance
  - Easily be startled if forgetting location

Looking into the LIT review findings, and information gathered from the surveys, interviews, and observations, how does it all connect?



# 5 | DISCUSSION

What conclusions can be drawn from the research? Is there anything from the expert interviews and surveys that can be connected and/ or relate to the LIT review research? The discussion is where these will be answered.

Throughout the research in the LIT review, there was a plethora of information and academic reports that look into the early detection of Dementia Alzheimer's. However, there was not much on the patient's living with the disease once they are diagnosed.

The colour research into Dementia patient's possible preferences, universal design, already existing products, their mental health, and how important independence is to them, was crucial in understanding what is required and if there are any gaps in the research.

The doctor's survey answers of colour preferences, validate the research from two article sources reports on Dementia Alzheimer colour preferences. With strong contrast and difficulty with blue and green differentiating.

The quantitative data provided an insight into safety, happiness, and independence of patients living with the disease. With the qualitative data providing a more personal opinion from the participants into independency and possible future technology. These survey responses on future wearables were further validated from the interviews with Fred and Caitlin.

Fred's speech and wording was specifically noticed towards dad. As researched through the *Us Against Alzheimer's* source, the rules of not asking if the patient remembers things and not telling them they are wrong with something were notified.

Caitlin's recommendation to increasing public awareness for Dementia patients was further educating the community, which was further validated by the *ethical issues in preventing Alzheimer's* article.

Both interviewees agreed the public awareness for people with Dementia is minuscule. However, they both suggested different solutions to this problem.

From the LIT review, Caitlin's research, and Fred's past experiences, talking and human interaction is seen as one of the better solutions for assisting the Dementia patients' mental health. However, in some instances, it can also be detrimental to others around them. Caitlin agreed that with partner interactions, it can be quite burdensome, which correlates with the mental health burden of carers (which was notified in the LIT review).

How can burden and independence be assisted with people living with Dementia Alzheimer's and their partners/ carers? What designs and concepts can make their lives a little better?

## 6| DESIGN IMPLICATIONS

In addition to the research findings and the LIT review process, Universal Design to Australian standards will need to be assessed and followed for any concepts drawn. The 8 goals consist of: “body fit, comfort, awareness, understanding, wellness, social integration, personalisation, and cultural appropriateness.” (Universal Design Australia, n.d.).

The Design Implications section will explore five concepts that solve the issues and key opportunities that were found within the research.

Opportunities and/ or problems identified:

- Independence and freedom of people living with Dementia Alzheimer’s
- Alleviate burden and stress from partners and carers
- Increase public awareness of people with the disease, through education or signifiers
- Allow confused patients to be assisted without becoming aggressive or defensive
- Assist the interactions between partner and carer and the person living with Dementia Alzheimer’s
- Include the colour violet into concepts, as that is what these patients prefer. Violet’s emotions share a sense of wisdom, mystery, and spirituality, as it is a combination of red (high-energy) and blue (calming).

Through thorough research, I have deduced what is required for a potential product for those living with Dementia Alzheimer’s. Additional research into pre-existing Dementia products was needed to get an understanding on what was already on the market. The pictures and analysis of these pre-existing products can be found in Appendix 5.

Pre-existing product conclusions:

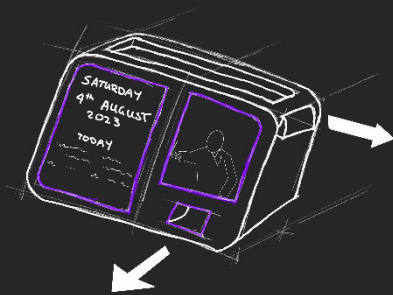
- Alzheimer’s disease is the more common type of Dementia, progressively worsens memory, cognition, and behaviour. This progresses until daily living becomes quite difficult
- Assistive technology that allows Dementia patients be more independent lifts their mood. Which also lifts some stress from partners and carers
- Location and communicative solutions for wearables furthers this independence
- All of these GPS wearables are developed and distributed overseas. Whereas, Australia only has products to assist at home, and simple GPS trackers in the Dementia wards.
- Even though most of the public are happy to assist elderly with this disease, the design cannot ‘fully’ rely on the public to utilise it.

Below are five concepts that assist to solve the above opportunities and problems.



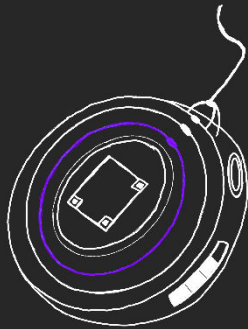
#### Concept 1 Thoughts:

This hub concept is too general and could be used for any sort of mental disease or senior patients. It could also be easily surpassed and made redundant by a reminder on a mobile device.



#### Concept 1 Dementia Hub:

- Interactive hub where the screen on the left features dates, events, medication, reminders etc.
- See-through panel on top to view pill levels
- Pull-out panel on the right to top-up medication
- Patient can insert memorabilia of loved ones on the right, with a pill exit compartment underneath



**Concept 2 Pendant Wearable:**

- A device that is the size of an average pendant. To be worn around the neck.
- Three rings that light up, depending on the severity of Alzheimer's
- QR code allows public to see basic information on patient. As a QR code, it can be scanned without being in

direct contact with them. Also acts as a SOS button. Perhaps the patients voice can activate more information to be viewed on someone's phone?

- Preferably all black, minus the violet ring
- Charging port on side for internal battery. Could either be charged using a cable or via a dock. Should have enough battery life for it to last a few days at least.
- Battery level indicator next to the port

**Concept 2 Thoughts:**

The pendant would need to be put on and removed to charge, which may be difficult for some patients. Some may also not like the feeling of something around their neck, and it may also reduce freedom of motion.



- Battery indicator on the side
- The strap is to be made from a sustainable and waterproof material

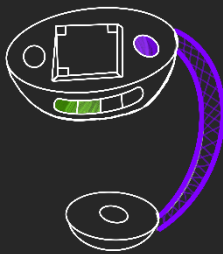
**Concept 3 Thoughts:**

The wristband would be a more permanent solution, only needing to be taken off to recharge whenever necessary, and able to survive through multiple conditions.

**Concept 3 Wristband Wearable:**

- Similar functions to Concept 2, with the button and QR code on the face
- The severity of Alzheimer’s is only indicated with a single LED instead of a ring. Can be more discreet and not ‘out-there’.
- GPS locator when leaving geo fencing (from wandering). Lights up to signify ‘help’ for public recognition if needed.
- Charges wirelessly on dock via the rear





#### Concept 4 Collar Wearable:

- Similar functions to previous concepts with QR code on the face, and battery indicator in green on the side.
- There are two severity indicators are featured on either side of the QR code, that light up violet.

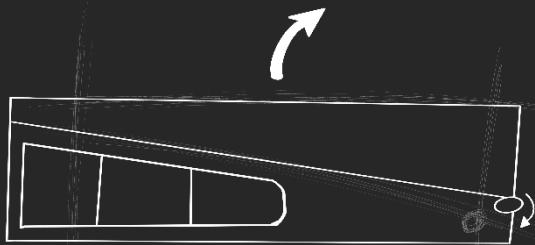
- The main unit is attached with a magnet attached to the rear, with some form of clothing between. A violet strap-like material attaches the two parts.
- Strap can be customised to suit the user and the kind of clothing they are attaching it to.

#### Concept 4 Thoughts:

Violet colouring on the strap and front is to keep the patient calm if they are ever wander. The secure connection will keep the device secure through regular use.



**Concept 5 Interact with Family Digital Picture Frame:**



- Bring up memories that the Dementia patient can talk to their family about when they visit.
- Pre-recorded by family members, for the photos and videos that are installed onto digital picture frame.
- Features thicker screen and base, which assists those patients with weak finger strength.
- Folds into a 'book-like' package, then stored into a bag with a sling. Can either be held securely by the patient or carer.
- Device features its own GPS tracker, battery, screen, and speakers.
- The device instantly turns on when opened onto a countertop and starts going through recordings.
- The Dementia patient should not need to interact with the device, but it should be reminiscent of a one



photo picture frame. Reminding them to kick out the back support.

Concept 5 Thoughts:

Can be quite beneficial to families reconnecting. However, privacy would come into play rather quickly with what data the device can store. Must be simple to use and manoeuvre for the Dementia relative to inspect, interact and comment.

# 7 | CONCLUSION

This report has performed a thorough investigation into Dementia Alzheimer patients' independence, individuality, freedom, their preferences, and how carers and partners react. This was researched through a detailed literature review, online surveys, interviews with experts in their field, and slight observations of those workplaces. This research was conducted to find a solution that further assists those, using Industrial Design knowledge and skillset.

To further this established research report, mapping out where the concepts will intervene is crucial to forming a suitable and appropriate outcome.

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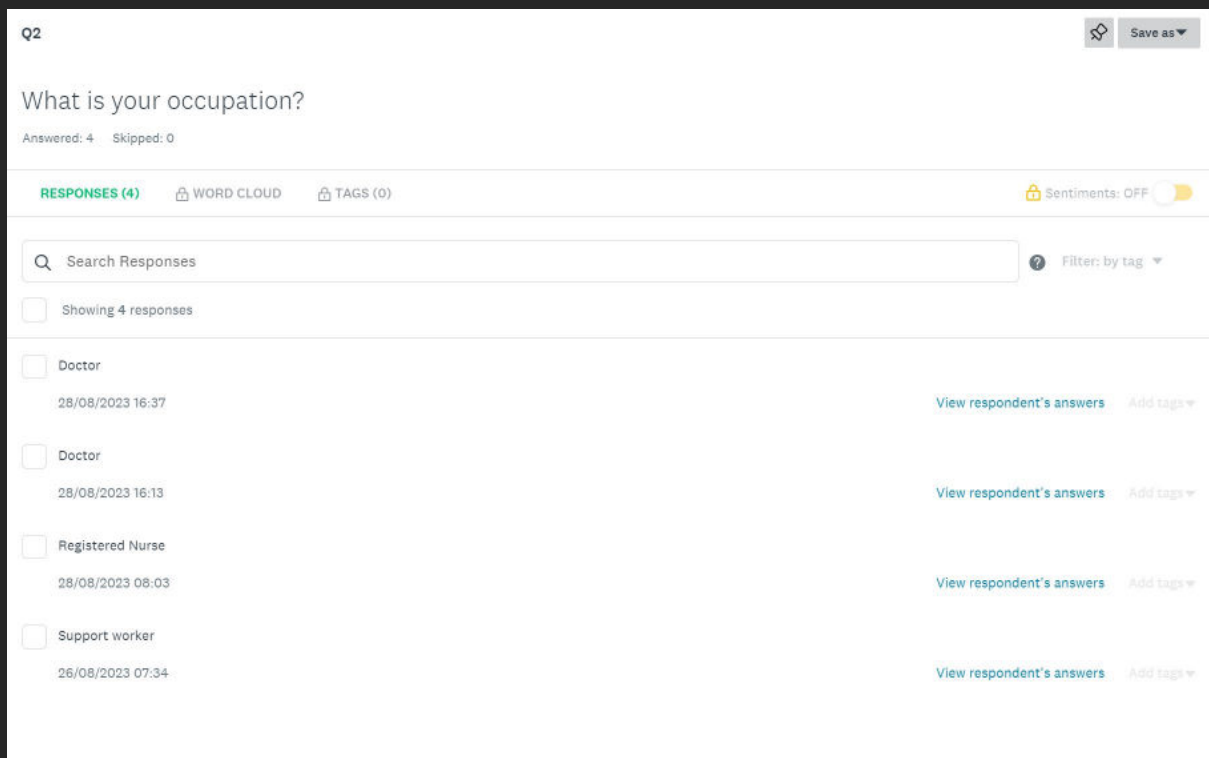
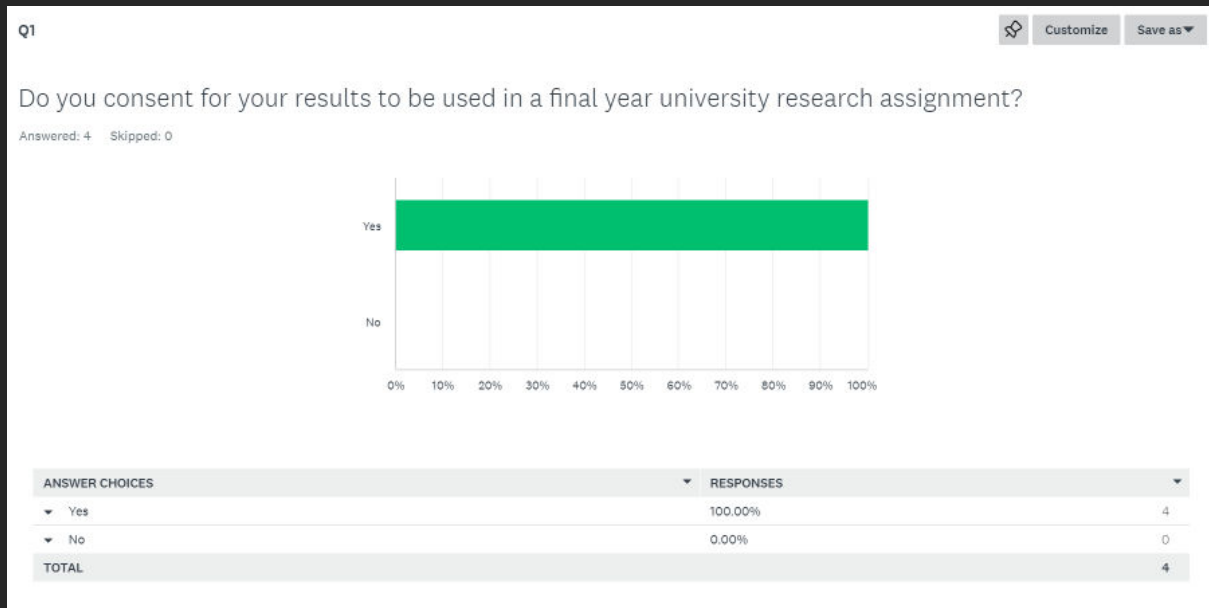
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# APPENDIX

## Appendix 1 SurveyMonkey photos:



Q3

Save as

### How can someone with Dementia be more independent?

Answered: 4 Skipped: 0

RESPONSES (4)

WORD CLOUD

TAGS (0)

Sentiments: OFF

Search Responses

Filter: by tag

Showing 4 responses

By having support & a good environment

28/08/2023 16:37

[View respondent's answers](#) [Add tags](#)

Community access supports; carer availability to support occupational/hobbies/interests.

28/08/2023 16:13

[View respondent's answers](#) [Add tags](#)

People with dementia need support to be independent. Unfortunately as the disease progresses people are unable to organise themselves to do independent activities, but with support they can feel as though they are keeping busy.

28/08/2023 08:03

[View respondent's answers](#) [Add tags](#)

Depending on the stage of dementia. Lots of support, routines and reminders someone with dementia can have as much independence as it would be safe for them

26/08/2023 07:34

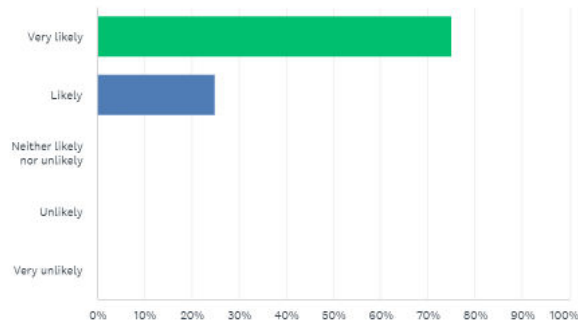
[View respondent's answers](#) [Add tags](#)

Q4

Customize Save as

### Are Dementia Alzheimer patients more likely to be content when/ if given the opportunity to be more independent?

Answered: 4 Skipped: 0



ANSWER CHOICES	RESPONSES
Very likely	75.00% 3
Likely	25.00% 1
Neither likely nor unlikely	0.00% 0
Unlikely	0.00% 0
Very unlikely	0.00% 0
<b>TOTAL</b>	<b>4</b>

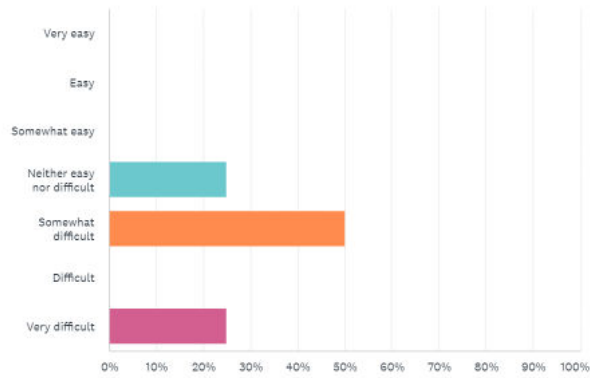


Q5

Customize Save as

### How difficult is technology for Dementia Alzheimer Patients?

Answered: 4 Skipped: 0



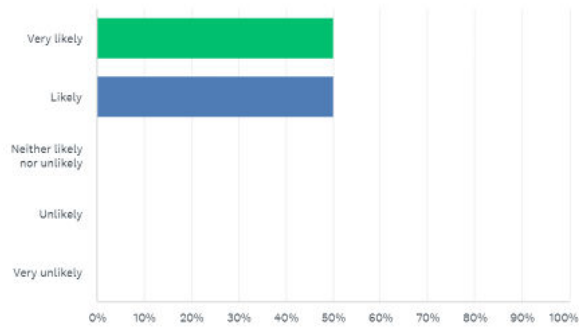
ANSWER CHOICES	RESPONSES
Very easy	0.00% 0
Easy	0.00% 0
Somewhat easy	0.00% 0
Neither easy nor difficult	25.00% 1
Somewhat difficult	50.00% 2
Difficult	0.00% 0
Very difficult	25.00% 1
<b>TOTAL</b>	<b>4</b>

Q6

Customize Save as

### How prone are Dementia Alzheimer patients to getting lost without a carer in the middle to severe stages?

Answered: 4 Skipped: 0



ANSWER CHOICES	RESPONSES
Very likely	50.00% 2
Likely	50.00% 2
Neither likely nor unlikely	0.00% 0
Unlikely	0.00% 0
Very unlikely	0.00% 0
<b>TOTAL</b>	<b>4</b>

Q7

Save as

Have you seen any preferences towards any particular colour in the middle to severe stages? If yes, please specify.

Answered: 4 Skipped: 0

RESPONSES (4) WORD CLOUD TAGS (0)

Sentiments: OFF

Search Responses

Filter: by tag

Showing 4 responses

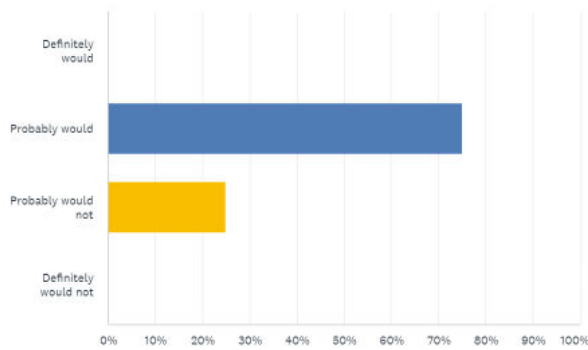
- contrast colours work best  
28/08/2023 16:37 [View respondent's answers](#) [Add tags](#)
- No  
28/08/2023 16:13 [View respondent's answers](#) [Add tags](#)
- Unsure  
28/08/2023 08:03 [View respondent's answers](#) [Add tags](#)
- No  
26/08/2023 07:34 [View respondent's answers](#) [Add tags](#)

Q8

Customize Save as

Would a personal alarm device be effective and trustworthy if it was used by one of these patients?

Answered: 4 Skipped: 0



ANSWER CHOICES	RESPONSES
Definitely would	0.00% 0
Probably would	75.00% 3
Probably would not	25.00% 1
Definitely would not	0.00% 0
<b>TOTAL</b>	<b>4</b>

Q9

Save as

There are Dementia wearables that have been concepted overseas, have you heard of any implementations of those technologies here?

Answered: 4 Skipped: 0

RESPONSES (4)

WORD CLOUD

TAGS (0)

Sentiments: OFF

Search Responses

Filter: by tag

Showing 4 responses

- no  
28/08/2023 16:37 [View respondent's answers](#) [Add tags](#)
- No  
28/08/2023 16:13 [View respondent's answers](#) [Add tags](#)
- Yes, we have seen personal alarm devices, however they only work as long as they are charged up.  
28/08/2023 08:03 [View respondent's answers](#) [Add tags](#)
- No  
26/08/2023 07:34 [View respondent's answers](#) [Add tags](#)

Q10

Save as

Do wearables have an important role in the medical, health and aged/ disability care sector?

Answered: 4 Skipped: 0

RESPONSES (4)

WORD CLOUD

TAGS (0)

Sentiments: OFF

Search Responses

Filter: by tag

Showing 4 responses

- yes  
28/08/2023 16:37 [View respondent's answers](#) [Add tags](#)
- Potentially an area of interest to explore. I don't have knowledge of this firsthand.  
28/08/2023 16:13 [View respondent's answers](#) [Add tags](#)
- They could, but it is important to remember that sometimes people are unwell to a point where wearing a device may not be compatible.  
28/08/2023 08:03 [View respondent's answers](#) [Add tags](#)
- I haven't had experience with it  
26/08/2023 07:34 [View respondent's answers](#) [Add tags](#)

## **Appendix 2 Interview transcripts:**

### **CAITLIN'S INTERVIEW TRANSCRIPT**

**Dean:**

I am here with Caitlin at the Mater Memory Clinic. So, could you tell me what is your occupation and what is the basis of what you do?

**Caitlin:**

Sure. I am a registered nurse. My role is I am a clinical research nurse supporting the research that happens in the clinic by mainly the lead consultant. But I also support the clinic as a nurse. So, it is really both, both sides of being supportive as a nurse and if people do opt to do any research, helping them do that. So, whether that is a drug trial or an intervention trial or going to the uni and doing research, but regardless, everybody still gets the same support.

**Dean:**

Awesome. Yeah. That is great. How long have you been in the industry for and what is the reason for joining and helping people with, or like assisting people with their diseases?

**Caitlin:**

I started nursing, seven years ago. So, I came to it a little bit later in life. I was a teacher before and I decided to become a nurse in Australia. I like people and I like supporting people, and I fell into this job because there was an advertisement internally. Previously worked in the ward as a nurse and in the patients, and I just wanted to give it a try and very happy with the role.

**Dean:**

Yeah. That is good. So, staying within the whole Mater company. That is good. Just delving into the kind of dimension of Alzheimer's. Do kind of like pop-ups or unplanned activities, or things to do, do they normally cause them anxiety? Like unplanned activities.

**Caitlin:**

Like spontaneous activities? I think people with Alzheimer's, it really, it depends on the person. Some people if they are very organised and had a lot of structure to their life and they have issues with memory, they might really like to have a planned diary. They might struggle with new environments, new activities, but if it is a spontaneous activity that they are well familiar with, I cannot see why not. If they like spontaneity. Depends on the person though, I would say.

**Dean:**

Of course. Definitely. Then would you say, Dementia as a whole would be very similar to that as well?

**Caitlin:**

Depends. There are some types of dementia where people are maybe a little bit more rigid in what they want to do. And so, popup spontaneity would be probably an issue. It depends on the person, and the diagnosis. So, if they have dementia in the frontal part of their brain, that is called Frontotemporal Dementia, and it might affect their behaviour and a person might be really rigid.

Like they might want their dinner exactly at 5:00 PM every night. And they are not able to because of the disease in their brain. Be flexible.

**Dean:**

Yes. Okay. Well, that is great. More structured and pleasant activities. Like you are talking about before, do you think that would be more beneficial to their mood and reduced signs of agitation as well?

**Caitlin:**

Yeah, I think the key thing is that people need to feel like they are doing worthwhile and enjoyable things. Regardless of if you just all of a sudden have a diagnosis of dementia, whatever it is, should not stop people from doing the things they love to do. Often people really have to give up a lot. They might have to give up work if they are young. They may have to give up certain activities for safety and that that can really make us lose a lot of happiness and joy in our life. It is imperative that people do fun and meaningful and enjoyable activities. Keep them going. Keep them active.

**Dean:**

That is good. How do you keep yourself from getting frustrated when they forget things or they struggle with completing those tests, how do you control your kind of frustration?

**Caitlin:**

I think it is a really big difference when it is a loved one or family member. And if you are the person directly caring for the person. If I am honest, I think because I only meet people in the context of the clinic or research, I understand. I do not have to spend 24 7 with that person. In my experiences, when people, it is natural to be frustrated, of course. It is totally natural. I guess I think I would answer your question by saying, because I do not spend that much time with people, I do not have the chance to get frustrated. I guess because I can clearly see from my nursing eyes that it is the disease and not the person.

**Dean:**

You can kind of like differentiate it too?

**Caitlin:**

Yeah. I think it is really because it is I am a step away as a nurse. I am not in their family or a friend. If it were my own parent or my family member, I am sure I would experience that a lot more.

**Dean:**

Yeah. That is fair. Do you find that people with Dementia Alzheimer's experience happier lives when they are more active being outside doing activities and not so much reliant on a carer to look after them?

**Caitlin:**

Yeah, that is a good question Dean. I think that with happiness and satisfaction, a lot of that comes from maybe not being frustrated. And I guess if you have to rely on someone to do a lot of things with you or for you, you might get frustrated. But also, a carer might, if they are really skilled and have a good relationship with a person, it might not have that impact. I think to me it is more the frustration that people get with their own symptoms. That is the hardest thing. And we know that

we can do things like help change the way spaces are and ensure they have activities. Those are all great things to do, but sometimes you really do need some medication to help with that. But I think being as independent as possible is going to make people feel as confident as possible.

**Dean:**

Absolutely. Especially, we were talking before about driving.

**Caitlin:**

Oh, a hundred percent, driving is a big one. I would. I have only driven for 10 years, and I feel like if I had my car taken away from me, it would be a huge, huge change.

**Dean:**

Yes, it would. Public recognition of people living with the disease is not really much. Think of something like a white cane for the blind. That is kind of recognisable from the public. Do you think some sort of recognition piece would be beneficial to those kind of people in public?

**Caitlin:**

Yeah, I think it is great. I think if it went along with some good public education about personal perspectives that people with dementia. In the general public, sometimes they get thought of as they cannot make decisions for themselves anymore. They cannot do anything anymore. So, people kind of all of a sudden think that person, then treat them differently. I think as long as we had a really good campaign to educate the public that people, just because they have a diagnosis of Dementia does not mean they are any less capable of making decisions for themselves. For instance, some people with rare types of Alzheimer's have trouble seeing. Recently I met somebody who had just a little badge that said, I have low vision. So, it does not give you the big perspective. But it still says hey, I might need some assistance. I think it is a great idea and something that in consultation with people with Dementia and groups who represent people with Dementia. It could be a really good idea.

**Dean:**

Alright. Do you feel keeping people with dementia Alzheimer's at home longer is more beneficial for their mental health and might slower the progression of the disease compared to moving them into a support home?

**Caitlin:**

I think that really, again, depends on the person. Really depends and on the family. Because you might run into a situation where people are very confident and want to keep somebody at home but then also some families feel pressured to keep people at home and it is very hard. So, it comes down to whatever is right with people. If we had be those beautiful facilities like they have in Europe, and if we had those, that would be great.

**Dean:**

Have you seen the ones in Sweden?

**Caitlin:**

No, I have not.

**Dean:**

I can show you. They are amazing.

**Caitlin:**

Yeah. I think in those circumstances that would be great. In the worst-case scenario, often it's probably best to stay at home as long as everybody's up for it.

**Dean:**

I might show you afterwards, but it is actually really interesting. They fully support the Dementia patients and their partner moving in with them as well. Everybody gets involved and supported as well. It is all social groups there as well. Keeps them engaged. Speaking of have you heard or seen of any conceptual wearables that assist people with Dementia?

**Caitlin:**

Yeah, I have in some of the clinical trials, not clinical trials I should say, but some of the patients in the clinic will have a necklace or something that might have some GPS tracking. In case somebody likes to walk. Sometimes people just like to go on a bit of a mission. It is a fine line of making sure it is safe and they can do that. That is probably all I know about.

**Dean:**

I have got a few photos of the ones overseas. This one here attaches to the collar. So, it is similar to what you have got. It is for wandering, confusion and memory loss. Uses Bluetooth, it is more discreet, and it just hangs there instead of being like a lanyard and sometimes people do not tolerate it well.

**Caitlin:**

I have heard of people sewing little tags into clothing.

**Dean:**

Also, this one here. So, this one is kind of like a NFC thing, so it stores their essential info on the wristband. If you scan with a phone and has all the information on there. Then there is that one. I think it is what you were telling about is similar to what they have got in the disability and aged care. Then it has got a SOS button if they fall over.

**Caitlin:**

Yeah, my grandmother had one of those. They are great, and it is a bit of reassurance. There is a way of communicating for the carers and the partners too. You know that they are safe.

**Dean:**

With what we have here, do you think more of that advanced technology, like the profile scan or essential information would be beneficial if implemented here?

**Caitlin:**

I guess it the kind of difficulty with all that technology, is that nothing replaces like having a conversation with someone. So, I think in the setting of the hospital, maybe. Maybe if they were a

patient, but people can get really, if they are in hospital, quite unwell and they might not like the feeling of things on them. Yeah so, I'm not sure.

**Dean:**

Does that GPS device work outside the hospital as well?

**Caitlin:**

Well GPS only works really if you have triangulation of internet connections. So, I do not know. I think they probably to help people to feel like they have a little bit more freedom to walk around a ward that does not have an easy exit. So, they are kept safe in the ward, there is no risk of going somewhere. But if somebody could not be found, they might be able to just say, oh, they are over there. And then check from a distance. Because I think just in my experience, when you are nursing somebody who is really confused and having kind of an issue with their health or they might be delirious, constantly going after the person is a fine line, you know? They might get a bit scared as well, agitated and upset. I would get frustrated too. So, if you could just have a little something on and then be able to find where they are in the ward and just from a distance check if they are okay, maybe that would be a good idea.

**Dean:**

At least it also keeps their independence as well.

**Caitlin:**

Yeah. That is right. Because that is definitely important.

**Dean:**

Yeah. It keeps them motivated. Happy, and active. Cool, well I think that is all. Thanks for your help with this interview.



## FRED'S INTEVIEW TRANSCRIPT

**Dean:**

Alright, I am here with Fred, my dad's support worker. Just got questions for him here. Can you give me a quick basis on what you do?

**Fred:**

I am a support worker. I support my clients who I work with, however they need it in whichever way.

**Dean:**

How long have you been in the industry for and what was the reason for joining and helping those in your work?

**Fred:**

I would say that it has probably been at least five years, maybe a bit longer. Cannot remember, a lot of years go by, but I would say at least five years. What led me to it is I actually got sick myself. I could not work and lost my job, everything. Then for about two years I could not work because of the illness. Then after getting better, I kind of just got to a point in my life where I was wondering what am I going to do now? I thought, well, I am going to help people. I guess for that time it was really terrible where you could not help yourself. Because that happened, I have had a feeling there would be other people in the world that is going through the same. The worst is you cannot really help yourself and then there somebody that can just help or even just listen to you or do something and it makes a huge difference. Then obviously I found this. Which is fantastic, I love it.

**Dean:**

That is great to hear then. Just going into the questions on Dementia, in your experience, do unplanned activities, does it cause some anxiety to them? If like things like pop up or things come unplanned?

**Fred:**

It just depends on the client but in general, I would say yes. Unless somebody is open to it. I would say most people do not like surprises. We all are very routine orientated, so if you go someplace every Tuesday and suddenly you change it. It would definitely cause anxiety. It has happened in the past with weather changes or people are thinking you can go there which is out of everybody's control, and then it could be a very tough day.

**Dean:**

That is amazing. Building off of that, are more structured and pleasant activities more beneficial to their mood and reduce signs of agitation?

**Fred:**

A hundred percent. Yeah, no, for sure. Definitely.

**Dean:**

How do you keep yourself from getting a bit frustrated when, say some of your Dementia clients forget things that you have just told them a few minutes ago?

**Fred:**

I think it has been because I have been doing it for so long. It is like when you work with somebody that does not have Dementia and they do something, it is very different than when you work with somebody that has it. Because it is not in their control. So, I guess it depends on people's personality as well. But for myself, it does not bother me, I am used to it now. I would have some conversations thousands of times, and that is fine. I do not mind. It is just part of it. Then a lot of times, I guess with some stuff that happens is sometimes people get stuck in a loop and you got to finish that. If you do not, you cannot go to the next thing. So, sometimes you got to have that same conversation or have that same thing again so that you can finish it. Because if you do not do that, people could get stuck on that and then do not move forward for the day. So sometimes even if it may be frustrating, it is always better to do those things because once you get it out of the way and out of the system, it kind of opens the day up to a lot more opportunities to move forward, I guess.

**Dean:**

Do you find people with Dementia Alzheimer's, or just Dementia as a whole, experience happier lives when and if they are more active, being outside doing activities and not so much relying on someone being there for them?

**Fred:**

Meaning to do things autonomously on their own? It is a bit of a tough one, depending on which stage they are. Like early stages definitely. But from the middle stages on, it is really hard for people to do things by themselves like this. They are a danger to themselves. Plus, they just cannot make good decisions, like adults would. It becomes like five-year-old children where they could walk in front of a car and one day, they might know to do it, and the other day they forget to do it. It is a safety thing, a big thing is getting lost, and once you get lost, they get confused then things turn really bad once you get to that stage. So, more like in terms of safety, it is definitely absolutely necessary, especially in the later stages. Even just decision making, it is not there. Unfortunately, if somebody is not there to help, those decisions will definitely lead to some really bad things.

**Dean:**

Yeah definitely. So public recognition of people living with Dementia is not really there. Think of something like a white cane for the blind and hearing aids for those that have difficult hearing. They have this kind of disability; they might need help with something. Do you think some sort of recognition piece would be beneficial for those people living with Dementia out in public?

**Fred:**

I guess it is a bit of a hard one. Like you know, maybe in the beginning it can help, but like in the later stages it will be very difficult because they were on their own and make some bad choices. If somebody wants to interfere with that or want to help them, usually that leads to aggression. Just because everything is just firing off and people do not feel good. Because it is that they do not know who they are and that they are trying to help them. Even if somebody is not aggressive, they will become aggressive. Which we all do, you just feel threatened, like if you do not know who you are and where you are. Your immediate response either run away or fight So, it is a bit of a hard one. Where people that are deaf, if you put a hearing aid, they can still be autonomous. Where this is, a very different disease to just put a hearing aid in, you are fine. You can hear you do not need anybody, nothing changes, you can just hear. Where with Dementia you cannot take that away. That

is, it. I guess that is why the need for somebody there to assist and be able to do stuff is invaluable where no device or something can do that.

**Dean:**

Absolutely agree there.

**Fred:**

You know, the only thing you can really do, I guess, I do not have a lot of experience in it is basically if somebody gets lost so that they can be found. Some GPS or what they do what have now on some of these new watches. So, they can actually just find them. Anyway, you cannot compare it to just the hearing aid if that makes sense. I cannot think of a device that can do the same for somebody with Dementia. So, it is a bit hard. There is nothing that can just fix it. It kind of makes it hard with the awareness and stuff.

**Dean:**

I agree. Do you feel keeping people with Dementia Alzheimer's at home longer is more beneficial for their mental health and possibly slow progression of the disease compared to moving them into a disability support home?

**Fred:**

Well, this is just my opinion. What I have seen is, what I believe in is, is that is why I go in the community. The longer somebody or anybody does not matter what, Dementia or heaps of other disabilities, or even people that do not have it, depression or whatever. I just believe you got to be in the community and be part of the community, it makes a big difference. I am not a big believer of keeping people out of the community and just by themselves, but that is just my opinion. The longer somebody can stay at home or be in the community, I will always go for that. But that is for myself and what I have seen is best. I am sure not everybody will agree, but that is just what I have seen and what I believe in. If I think about myself, somebody wants to shove me in the room, or if somebody wants to take me out somewhere to see people and talk to people, I cannot see that it might be beneficial to just stay in a room. Especially Dementia people in those wards, have you been in those wards? Because everything gets locked up, they cannot get out. But it is for their safety. It can be very lonely, I would imagine. It is not good. But then a lot of people that do not have, I guess people that can take them out and support them, that is the only option for them. It is not the best option by far, but it is an option to keep them safe. But it is better than getting lost. The longer you keep somebody at home or in the community or engage with people and some type of freedom, that is always the best by far. Freedom independence is always a hundred percent.

**Dean:**

You were talking about the kind of GPS thing, like Apple watches and all that. For the people with Dementia going missing and all that, do you think it would be beneficial to have something simpler? Because I know from observing and just basic research, most people with Dementia now are in their sixties, seventies, eighties, whatever, they did not grow up with technology. Would they be open to using something that does not have much technology, and would it be beneficial for a really simple wearable for Dementia patients to use?

**Fred:**

Yes, definitely. Not just for Dementia, but other patients too. Like I am older too. If I can just push the red button or green button instead of opening a smartphone, it would be much easier, you know? Especially when it comes to Dementia Alzheimer's, having those options do these options and it might be a bad day. Or it might further make things worse. But actually, not having that technology, if that makes sense. It is just another thing to kind of trigger them. So, the simpler and easier, would definitely be much better.

**Dean:**

Alright, sweet. Well, I think that that is all I have got there. Thanks for your attendance with this interview.

**Appendix 3 Home Whiteboard:**





Appendix 4 Addenbrookes examination pages:



**ADDENBROOKE'S COGNITIVE EXAMINATION - ACE-III VERSION B**

Unit Record No. \_\_\_\_\_  
 Surname \_\_\_\_\_  
 Given Names \_\_\_\_\_  
 DOB \_\_\_\_\_ Sex \_\_\_\_\_  
 AFFIX PATIENT IDENTIFICATION LABEL HERE

Date of testing: \_\_\_\_\_ Tester's name: \_\_\_\_\_  
 Tester's signature: \_\_\_\_\_ Patient's age at leaving full-time education: \_\_\_\_\_  
 Patient's occupation: \_\_\_\_\_ Patient's handedness: \_\_\_\_\_

**ATTENTION** \*(Sum together only the items in BOLD for the M-ACE score)

➤ Ask: What is the	<b>Day</b>	<b>Date</b>	<b>Month</b>	<b>Year</b>	<b>Season</b>	<b>Attention</b> [Score 0-5] <input type="checkbox"/>
➤ Ask: Which	No./Floor	Street/Hospital	Suburb	State	Country	
						<b>Attention</b> [Score 0-5] <input type="checkbox"/>

**ATTENTION**

➤ Tell: "I'm going to give you three words and I'd like you to repeat them after me: apple, coin, chair." After subject repeats, say "Try to remember them because I'm going to ask you later."  
 ➤ Score *only* the first trial (repeat 3 times if necessary).  
 ➤ Register number of trials: \_\_\_\_\_

**Attention**  
[Score 0-3]

**ATTENTION**

➤ Ask the subject: "Could you take 7 away from 100? I'd like you to keep taking 7 away from each new number until I tell you to stop."  
 ➤ If subject makes a mistake, do not stop them. Let the subject carry on and check subsequent answers (e.g., 93, 84, 77, 70, 63 – score 4).  
 ➤ Stop after five subtractions (93, 86, 79, 72, 65): \_\_\_\_\_

**Attention**  
[Score 0-5]

**MEMORY**

➤ Ask: 'Which 3 words did I ask you to repeat and remember?' \_\_\_\_\_

**Memory**  
[Score 0-3]

**FLUENCY**

➤ **Letters**  
 Say: "I'm going to give you a letter of the alphabet and I'd like you to generate as many words as you can beginning with that letter, but not names of people or places. For example, if I give you the letter "C", you could give me words like "cat, cry, clock" and so on. But, you can't give me words like Catherine or Canada. Do you understand? Are you ready? You have one minute. The letter I want you to use is the letter "P".

				≥ 18	7
				14-17	6
				11-13	5
				8-10	4
				6-7	3
				4-5	2
				2-3	1
				0-1	0
				total	correct

➤ **Animals**  
 Say: "Now can you name as many animals as possible. It can begin with any letter."

**Fluency**  
[Score 0 - 7]

				≥ 22	7
				17-21	6
				14-16	5
				11-13	4
				9-10	3
				7-8	2
				5-6	1
				<5	0
				total	correct

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ADDENBROOKE'S COGNITIVE EXAMINATION - ACE-III VERSION B



**ADDENBROOKE'S COGNITIVE EXAMINATION - ACE-III VERSION B**

Unit Record No. \_\_\_\_\_  
 Surname \_\_\_\_\_  
 Given Names \_\_\_\_\_  
 DOB \_\_\_\_\_ Sex \_\_\_\_\_

AFFIX PATIENT IDENTIFICATION LABEL HERE

**mat**  
**ADDENBROOKE EXAMINATION**

**MEMORY**

> Tell: "I'm going to give you a name and address and I'd like you to repeat the name and address after me. So you have a chance to learn, we'll be doing that 3 times. I'll ask you the name and address later."

Memory  
 [Score 0 - 7]

Score only the third trial.

	1 <sup>st</sup> Trial	2 <sup>nd</sup> Trial	3 <sup>rd</sup> Trial
Linda Clark 59 Meadow Street Milton New South Wales	_____ _____ _____	_____ _____ _____	_____ _____ _____

**MEMORY**

- > Name of the current Prime Minister.....
- > Name of the current Premier of Queensland .....
- > Name of the USA president.....
- > Name of the USA president who was assassinated in the 1960s.....

Memory  
 [Score 0 - 4]

**LANGUAGE**

- > Place a pencil and a piece of paper in front of the subject. As a practice trial, ask the subject to "Pick up the pencil and then the paper." If incorrect, score 0 and do not continue further.
- > If the subject is correct on the practice trial, continue with the following three commands below.
  - Ask the subject to "Place the paper on top of the pencil"
  - Ask the subject to "Pick up the pencil but not the paper"
  - Ask the subject to "Pass me the pencil after touching the paper"
 Note: Place the pencil and paper in front of the subject before each command.

Language  
 [Score 0-3]

**LANGUAGE**

- > Say: "I want you to write two sentences. It can be about anything that you like. I want you to write in full sentences and avoid abbreviations." If the subject does not know what to write about, you could suggest a few topics. "For instance, you could write about a recent holiday, your hobbies, your family or childhood." If the subject writes only one sentence, then prompt for a second one.
- Sentences must contain a subject and a verb. Spelling and grammar are penalized. Sentences do not need to be about the same topic. See scoring guidelines for more information.

Language  
 [Score 0-2]

**LANGUAGE**

- > Ask the subject to repeat: 'caterpillar'; 'eccentricity'; 'unintelligible'; 'statistician'  
 Score 2 if all are correct; score 1 if 3 are correct; and score 0 if 2 or less are correct.

Language  
 [Score 0-2]

All clinical form creation and amendments must be conducted through Health Records.

Unit Record No. \_\_\_\_\_  
 Surname \_\_\_\_\_  
 Given Names \_\_\_\_\_  
 DOB \_\_\_\_\_ Sex \_\_\_\_\_


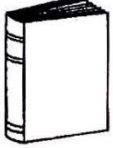
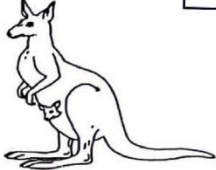


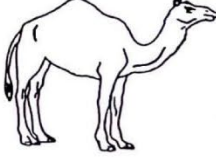

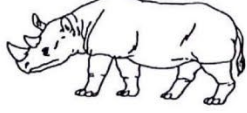




AFFIX PATIENT IDENTIFICATION LABEL HERE

**LANGUAGE**

- Ask the subject to repeat: 'All that glitters is not gold' Language [Score 0-1]
- Ask the subject to repeat: 'A stitch in time saves nine' Language [Score 0-1]

**LANGUAGE**

➤ Ask the subject to name the following pictures:

 _____ <input type="text"/>	 _____ <input type="text"/>	 _____ <input type="text"/>
 _____ <input type="text"/>	 _____ <input type="text"/>	 _____ <input type="text"/>
 _____ <input type="text"/>	 _____ <input type="text"/>	 _____ <input type="text"/>
 _____ <input type="text"/>	 _____ <input type="text"/>	 _____ <input type="text"/>

**Language [Score 0-12]**

**LANGUAGE**

- Using the pictures above, ask the subject to:
- Point to the one which is associated with the monarchy
  - Point to the one which is a marsupial
  - Point to the one which is found in the Antarctic
  - Point to the one which has a nautical connection
- Language [Score 0-4]**

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Unit Record No. \_\_\_\_\_  
 Surname \_\_\_\_\_  
 Given Names \_\_\_\_\_  
 DOB \_\_\_\_\_ Sex \_\_\_\_\_

AFFIX PATIENT IDENTIFICATION LABEL HERE

**LANGUAGE**

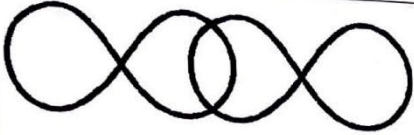
> Ask the subject to read the following words: (Score 1 only if all correct)

**sew  
 pint  
 soot  
 dough  
 height**

Language  
 [Score 0-1]

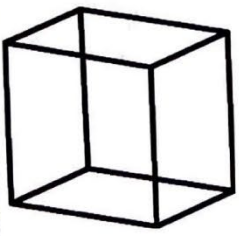
**VISUOSPATIAL ABILITIES**

> Infinity Diagram: Ask the subject to copy this diagram.



Visuospatial  
 [Score 0-1]

> Wire cube: Ask the subject to copy this drawing (for scoring, see instructions guide).



Visuospatial  
 [Score 0-2]

> Clock: Ask the subject to draw a clock face with numbers. Then, ask the subject to put the hands at ten past five. (For scoring see instruction guide: circle = 1, numbers = 2, hands = 2 if all correct).

Visuospatial  
 [Score 0-5]

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**ADDENBROOKE'S COGNITIVE EXAMINATION - ACE-III VERSION B**

Unit Record No. \_\_\_\_\_  
Surname \_\_\_\_\_  
Given Names \_\_\_\_\_  
DOB \_\_\_\_\_ Sex \_\_\_\_\_

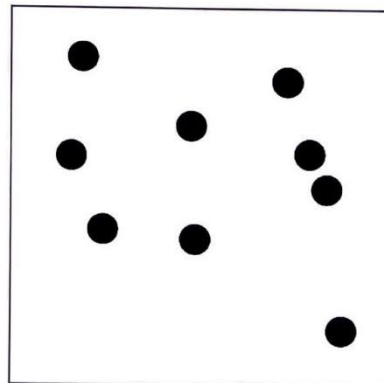
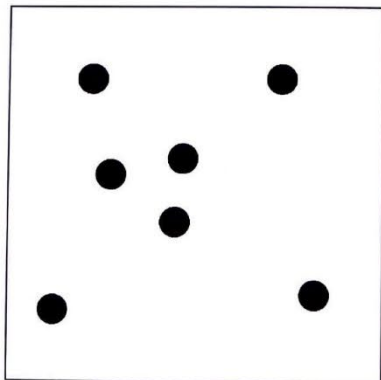
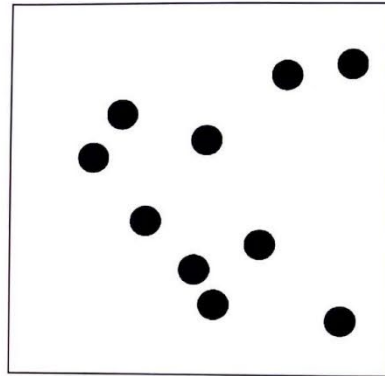
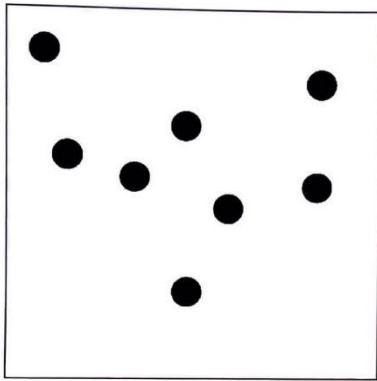
AFFIX PATIENT IDENTIFICATION LABEL HERE

**VISUOSPATIAL ABILITIES**

➤ Ask the subject to count the dots without pointing to them

Visuospatial  
[Score 0-4]

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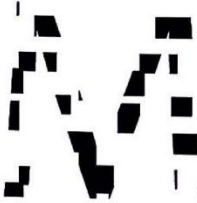


Unit Record No. \_\_\_\_\_  
 Surname \_\_\_\_\_  
 Given Names \_\_\_\_\_  
 DOB \_\_\_\_\_ Sex \_\_\_\_\_

AFFIX PATIENT IDENTIFICATION LABEL HERE

**VISUOSPATIAL ABILITIES**

➤ Ask the subject to identify the letters

Visuospatial  
[Score 0-4]

**MEMORY**

➤ Ask "Now tell me what you remember about that name and address we were repeating at the beginning"

Linda Clark  
 59 Meadow Street  
 Milton  
 New South Wales

Memory  
[Score 0-7]

**MEMORY**

➤ This test should be done if the subject failed to recall one or more items above. If all items were recalled, skip the test and score 5. If only part was recalled start by ticking items recalled in the shadowed column on the right hand side; and then test not recalled items by telling the subject "ok, I'll give you some hints: was the name X, Y or Z?" and so on. Each recognised item scores one point, which is added to the point gained by recalling.

Memory  
[Score 0-5]

Linda Clark	Laura Marshall	Linda Crawford		recalled
39	52	59		recalled
Meadow Street	Gardens Street	Meadow Road		recalled
Milton	Goulburn	Nowra		recalled
Queensland	Victoria	New South Wales		recalled

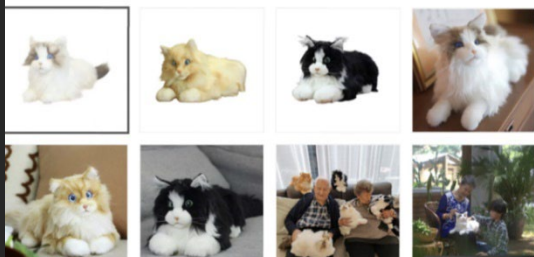
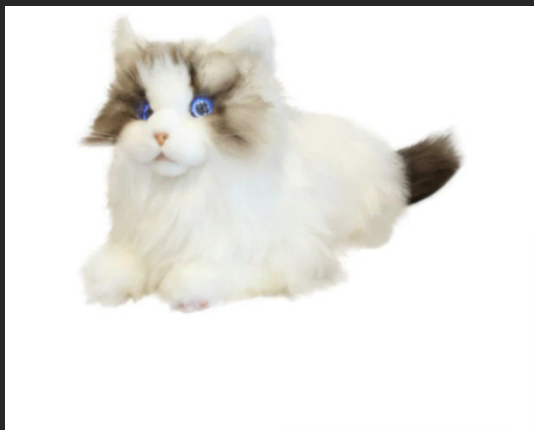
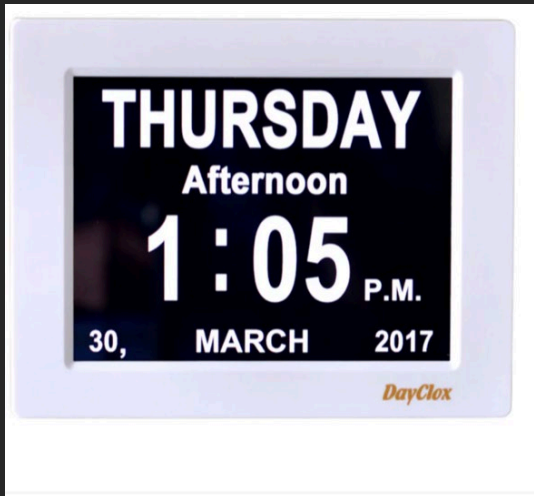
**SCORES**

<b>TOTAL ACE-III SCORE</b>	/100
<b>TOTAL M-ACE SCORE</b>	/30
<b>Attention</b>	/18
<b>Memory</b>	/26
<b>Fluency</b>	/14
<b>Language</b>	/26
<b>Visuospatial</b>	/16

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Appendix 5 Pre-existing Dementia products and analysis:





In order of appearance:

#### Koto Simple Music Player

- Designed to be simple and easy to operate
- Family and carers initially set up player by unloading music onto it
- Does not require any previous knowledge to operate, has been previously trialled
- Design is similar to an old radio, instantly recognised as something that plays music
- Lift flap to play and pause. Improves quality of life, especially alone. To be left on

#### Dayclox

- Digital and easy to read
- B&W, with additional colour settings
- 15 different languages
- Changes between “before dawn, morning, afternoon, evening, and night” (Dementia Shop, n.d.). Depending on time
- Auto night dimmer
- Bold lettering and numbers, which allows for clearer clarity

#### Metacat Smart Interactive Robotic Cat

- Soothing and engaging

- Provides emotional support, reduces anxiety and agitation
- “Encourages social interaction, sense of companionship and joy with care environment
- Therapeutic tool for enhancing cognitive stimulation and well-being” (Dementia Shop, n.d.)
- Realistic fur that is non-allergic
- Simulated heartbeat, various modes, and sensors that react to touch and auto sleep function.

#### Proximity Button

- Product is to solve wandering, which results from patient’s confusion and memory loss
- “Alzheimer’s Association – more than 60% of Dementia patients wander” (Mettle Studio, n.d.)
- Design is simple and discreet, uses Bluetooth
- “Used as an ‘early warning system’ by using beacon technology when leaving a safety radius from carer, can be viewed in an app” (Mettle Studio, n.d.)
- Restores patients’ freedom and allows them to lead active lives
- Designed by Mettle Studio for Proximity Care

#### Wearable Tech Wristband

- Features NFC, stores essential info about user (name, details of next of kin)
- Can be accessed when mobile app is open nearby, avoids physical contact which may cause unnecessary stress
- “Can be used by emergency services, health professionals, community members to help the lost/ confused patient
- Developed by a collaboration between the charity (Senior Citizen Liaison Team), Avon Police and Fire and Rescue” (Burnham-On-Sea, 2020)

- Relies heavily on public goodwill

#### Slow Alzheimer's Headband

- Slows the development of Alzheimer's
- Designed by YBrain
- "Using electrical signals, lessens the severity of the wearer's degenerative neurological condition, stimulates specific parts of the brain." (De Barros, Ana, 2014)
- Features sensors
- Used for those with the condition already, and elders that have mild symptoms, which could lead to early observations of Dementia Alzheimer's
- Launched first functional prototype in Korea

and movements that are sudden, indicating a possible fall (Australian Carers Guide, n.d.)

- Pendant and smartwatch, share similar functions
- Smart watches feature additional features, there are also pendants that have screens
- "Mainly purchased through age care homes, but individuals living at home may be able to get one through Government home support services or NDIS
- Includes charging docks or cable and geo fencing" (Australian Carers Guide, n.d.)

#### Dementia Isolation Assistive Tech

- Concept Research at Manchester Metropolitan University, in collaboration with Stockport Memory Clinic and KMS Solutions
- Wearable tech, phone apps and satellite tracking assists patients to have increased independence
- "Reduce social isolation and improve health outcomes
- Carer can locate Dementia patient while they move around independently in safe areas, and can contact them in emergencies" (Manchester Metropolitan University, 2016)
- Memory issues and confusion
- Increased isolation leads to further stress of partner/ carer

#### Senior SOS/ Personal Alarm

- Already in use in most senior care homes
- Auto dial alarms
- "Sends alert to pre-set phone numbers when alarm is pressed, located as a SOS button
- There are always 3 things that are on, GPS location, any increases in speed,